IODEF Forensics Extension

Chris Inacio
inacio@cert.org

authors

- Other contributors more than welcome
- More points of view welcome as well

Source materials

- Current (rough outline) draft based on the following:
  - DEXF - draft submission to ITU-T for handling forensic information
  - DFXML - Simson Garfinkle work on defining a forensics interchange format (http://www.forensicswiki.org/wiki/Category:Digital_Forensics_XML)
- Alternatives / More Standards
  - CybOX (http://cybox.mitre.org)

schema design

- Captures
  - Information about who did the initial forensics diagnosis
    - Who, what, where
  - The tools used to do the initial diagnosis
  - (DEXF & DFXML)

- Data items of interest
  - Notes them as byte-runs (DFXML)
    - offset + length into data source
- Wraps most things in a hash for integrity

Initial proposal schema

- Version
  - Major, Minor
- Site Name
- Examiner Name
- Evidence ID
- Creation Time
- Tool Name
- Tool Version
- Host Operating System

- Device
  - Device Type
  - Device Model
  - Device Serial
  - Sector Size
  - Device Sectors
  - Hash
    - Hash Type

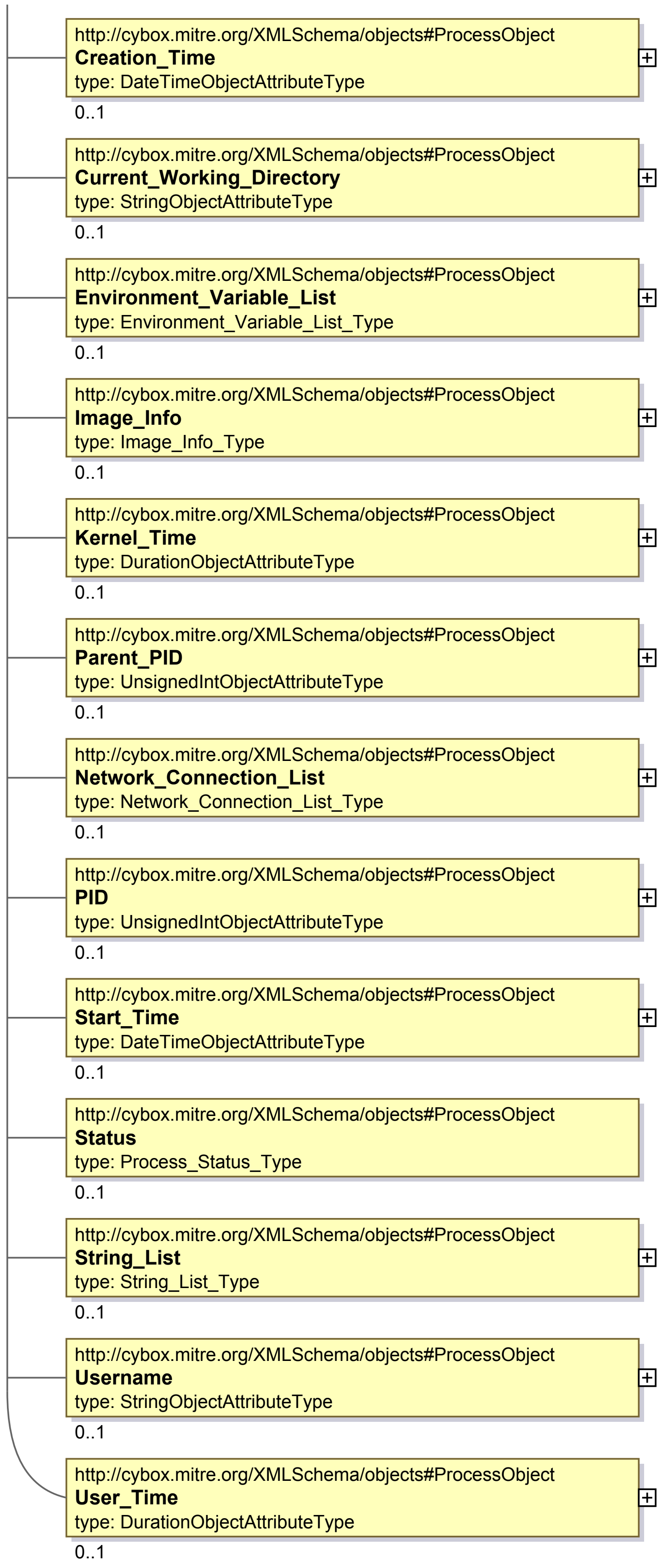
initial schema continued

- File Object
  - Name
  - ID
  - Size
  - Partition
  - Mode
  - ACL
  - mtime
  - atime
  - ctime

- byte run
  - hash
    - hash type
    - hash size
    - hash value

cybox v0.7

- CybOX - Cyber Observables (http://cybox.mitre.org)
- Originally designed to support to other standards
  - CAPEC - Common Attack Pattern Enumeration and Classification
  - MAEC - Malware Attribute Enumeration



http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Creation_Time
type: DateTimeObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Current_Working_Directory
type: StringObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Environment_Variable_List
type: Environment_Variable_List_Type
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Image_Info
type: Image_Info_Type
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Kernel_Time
type: DurationObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Parent_PID
type: UnsignedIntObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Network_Connection_List
type: Network_Connection_List_Type
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
PID
type: UnsignedIntObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Start_Time
type: DateTimeObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Status
type: Process_Status_Type
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
String_List
type: String_List_Type
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
Username
type: StringObjectAttributeType
0..1

http://cybox.mitre.org/XMLSchema/objects#ProcessObject
User_Time
type: DurationObjectAttributeType
0..1

cybox v0.7 more observables

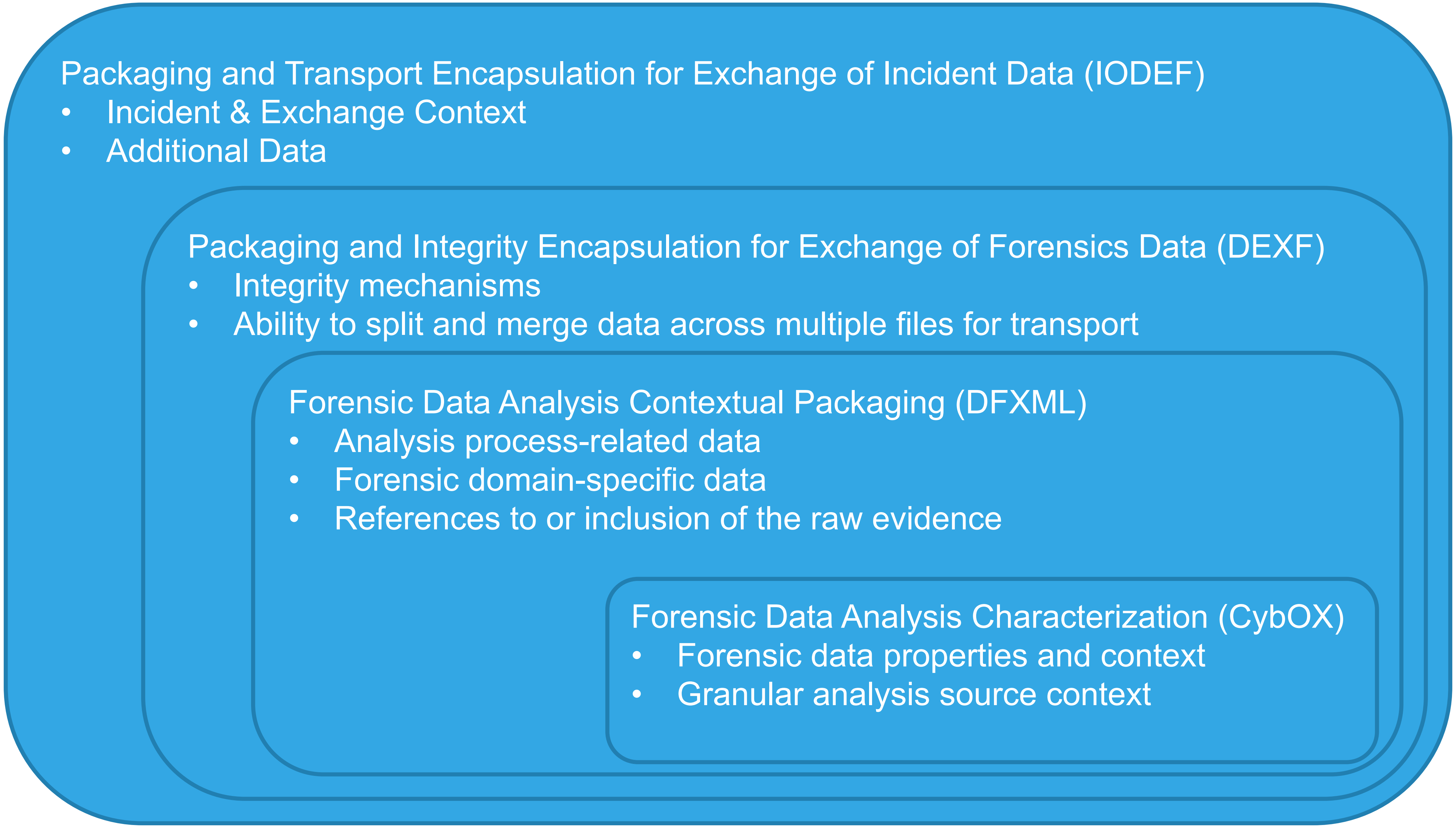
- Abstract file
  - unix file
  - windows file
- Semaphore
  - unix
  - windows
  - Disk
- Disk Partition
- Windows
  - Computer Account, Critical Section, Driver, Event Log, Event, Executable File, Kernel Hook, …

cybox object model

- Borrowed heavily from OpenIOC
- Contains lots of hints for malicious code (MAEC) and intrusions (CAPEC)
    - e.g. Ease of Obfuscation. Obfuscation Techniques
- Large underlying model for many SCAP / Making Security Measurable standards /

Cybox v1.0

- Being worked on now
- Working with Simson Garfinkle to extend CybOX v0.7 with DFXML
- Still basing many models on OpenIOC for data representation



Packaging and Transport Encapsulation for Exchange of Incident Data (IODEF)

- Incident & Exchange Context
- Additional Data

Packaging and Integrity Encapsulation for Exchange of Forensics Data (DEXF)

- Integrity mechanisms
- Ability to split and merge data across multiple files for transport

Forensic Data Analysis Contextual Packaging (DFXML)

- Analysis process-related data
- Forensic domain-specific data
- References to or inclusion of the raw evidence

Forensic Data Analysis Characterization (CybOX)

- Forensic data properties and context
- Granular analysis source context

Questions

- Does the working group want to adopt this?
- Other Authors?
- Do we want to wait on CybOX?
  - If so, what does that mean, how does that work?
- What model should forensics exchange